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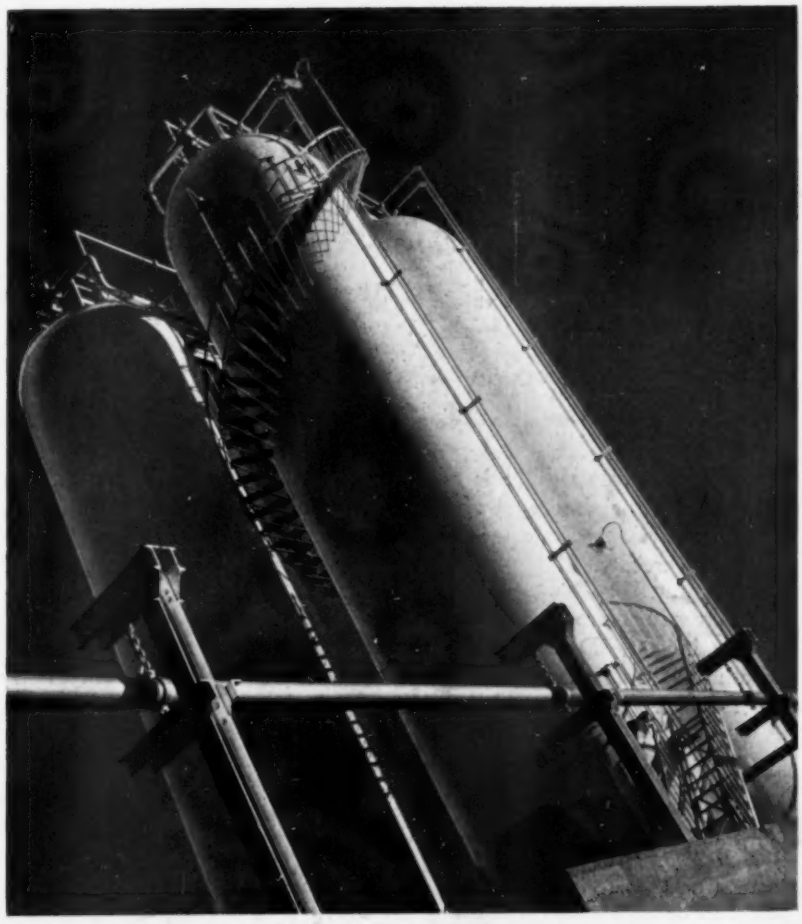
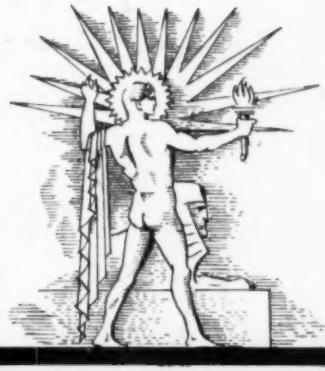
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





November 9, 1940

Towers for Defense

See Page 298

A SCIENCE SERVICE PUBLICATION

Do You Know?

Raisin seed oil finds a use in soap.

The biggest of *whales* may weigh as much as 37 elephants.

In early railroading days, experimenters tried equipping some cars with *sails*.

More than 500 articles of military equipment are made partly or wholly of *leather*.

Casein from about 30 quarts of milk is needed to make the *synthetic wool* for a dress.

Contrast in *sizes*—the largest male angler fish is one to two inches long, whereas the largest female is about three feet.

Sheep-like, the fighting *tarpon* can often be lured to the surface if shiny, fish-shaped decoys are drawn up as a "suggestion."

To train weather experts, important to national defense, the University of California has established a new division of *meteorology*.

The Aztecs of Mexico, says an anthropologist, practised *human sacrifice*, not because they held life cheap, but because it was the greatest gift to a god.

Puzzling to Alaskans, *lightning* has been frequent in the Mount McKinley area in the summers of 1939 and 1940, although previously it was almost unheard-of there.

The United States depends on Spain and Portugal for almost all of its *cork*, but California may start growing cork trees commercially.

By dropping into the water pebbles dipped in *oil*, Dalmatian fishermen smooth the water's surface in order to detect fish more easily.

A human being requires 10 years of *adolescence* to grow out of childhood into adulthood, but an ape requires only two years for this change.

A highway engineer says that some features of *road design* reduce snow drifting, and roads in snowy country might well be designed accordingly.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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RESOURCES

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ZOOLOGY

In what danger is the original specimen of the kouprey, previously unknown wild ox? p. 291.

SCIENCE NEWS LETTER

Vol. 38 NOVEMBER 9, 1940 *No. 19*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

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Cable address: Scienserve, Washington.

Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at $3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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MEDICINE

Better Protection From Flu Foreseen in New Discovery

Find That Two Different Viruses Act To Cause Epidemics in Independently Recurring Cycles

BETTER protection against influenza, predicted by many authorities to occur in a widespread epidemic this winter, seems possible because of a discovery announced by Dr. Thomas Francis, Jr., of New York University College of Medicine. (*Science*, Nov. 1.)

Dr. Francis has discovered a second virus that causes influenza. This second virus, to be known as Influenza B virus, was the cause of the flu epidemic in North Carolina early this year. It also caused the extensive flu epidemic of early 1936. It was not the cause of the epidemic of late 1936 and 1937, nor of the 1938-1939 epidemic. The latter epidemics were caused by Influenza A virus.

The two different viruses seem to cause epidemics in independent cycles. For protection against Influenza A, a promising vaccine has been made by Dr. Frank L. Horsfall, Jr., and Dr. Edwin H. Lennette, of the Rockefeller Foundation. If this vaccine lives up to its promise when tried in the fire of an Influenza A epidemic, and if another vaccine can be made for Influenza B, as seems likely, protection against many if not all influenza epidemics will be possible.

Large-scale production of Influenza A vaccine is now under way and it is being given as rapidly as possible to many thousands of persons in carefully controlled situations to provide a crucial test of the vaccine's protective power if an epidemic of this influenza comes this winter. Large quantities of the vaccine, it is understood, are also being produced for use in England, where war conditions make an outbreak even more probable.

The new B virus was discovered in the throat washings of children convalescing from rheumatic heart disease at Irvington House near New York City. Last February and March an epidemic of what appeared to be influenza broke out there. Tests of the material from these children's throats showed that the cause of the epidemic was not the A virus previously identified as a cause of influenza in some epidemics.

The Irvington House epidemic occurred at the same time as the influenza epidemic in North Carolina. Material from throats or blood of North Carolina flu patients turned out to contain the same virus as caused the Irvington House epidemic. Stored away in his laboratory, Dr. Francis had some blood serum from two patients who had flu during the early season 1936 epidemic. He got this out, tested it and found that these patients, like the Irvington House and North Carolina patients in 1940, had influenza B, but not Influenza A.

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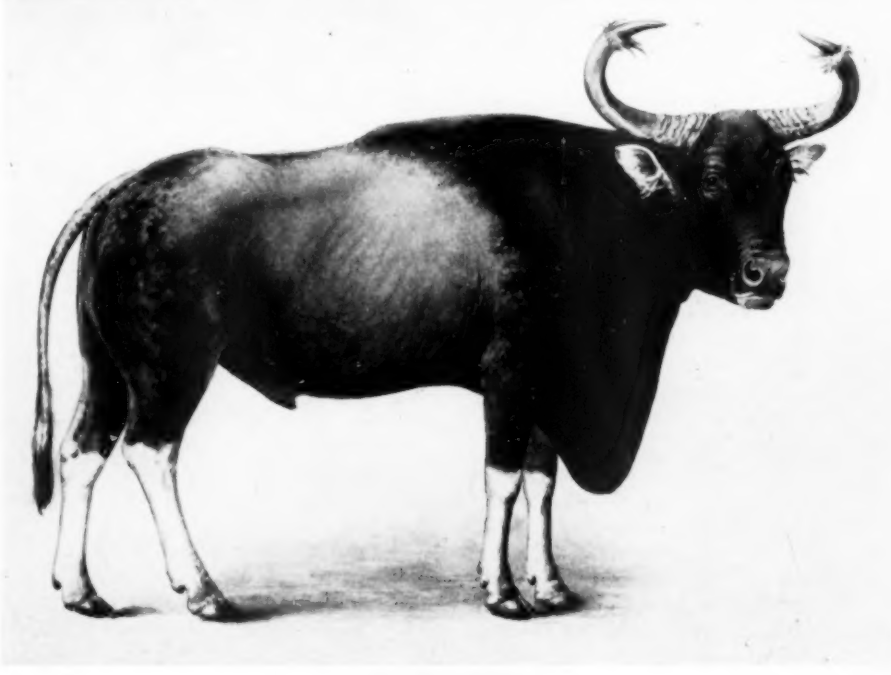


THE KOUPREY

Newest find in Asia's forests as painted by Eugene N. Fischer.

ZOOLOGY

War Stops Study of Kouprey, Newly Discovered Wild Ox

WAR, cutting off both France and the French colonies from world contacts, has put zoologists interested in certain of the larger wild animal species into a most tantalizing position. Just when details of one of the most astonishing discoveries of the present generation become generally available, the war clouds shut the animal off from further study—and may even threaten its very survival as a species.

The animal pictured at left is the kouprey, or wild forest ox of Indo-China, the first really large mammal to be discovered since the sensational finding of the okapi in Africa early in the present century. In a world considered fairly thoroughly explored, the presence of an animal as big as an ox, escaping all notice until now, is something really to be exclaimed about.

Although white men have known of the existence of the kouprey for about ten years, and a French zoologist, Dr. Achille Urbain, first briefly described it in 1937, it is only recently that the skeleton has been studied and a full scientific description has become available, with the publication of a monograph on the animal by Harold J. Coolidge, Jr., of the Harvard Museum of Comparative Zoology.

Mr. Coolidge's description is based principally on the hide and skull and skeleton of a full-grown bull kouprey, shot in 1939 at Samrong in Cambodia, about 150 miles north of Saigon, capital of French Indo-China, by a member of a Franco-American scientific expedition. There is (or was, at the beginning of

last summer's *Blitzkrieg*) a living specimen in the Vincennes Zoo, near Paris. The fate of this animal is at present unknown. It is considered the "holotype," or original specimen, to which all others are referred for scientific comparison, so that its disappearance would constitute a real zoological misfortune.

Fear Hunting for Meat

What may happen to all koupreys would become a matter of some concern if the Japanese should occupy all of French Indo-China: soldiers, of whatever nation, are not too meticulous about the source of fresh meat on the hoof. Furthermore, distress among the natives might intensify hunting, even in the absence of foreign soldiers. Zoologists will therefore be anxious about their new animal until peace and effective conservation laws bring them reassurance of its welfare.

The kouprey specimen at the Harvard Museum, as described by Mr. Coolidge, might be termed a living fossil. More primitive than many fossil cattle dug up in the Siwalik hills of India, this animal combines certain features of the bison, yak, gaur, bantin, and zebu. The body-hide is mainly grayish black. The conspicuously white stockings have a dark stripe on the front legs. Its tail is longer than that of any other known wild cattle of the region.

With Fringed Horns

The tips of the horns are surrounded by a frayed collar of shredded horn which seems characteristic of the male kouprey. The horns are large and crescent shaped, with the ends curved inward like those of the wild yak. The horns' sheaths are heavily wrinkled at the bases, which come close together as in some of the buffalo rather than the cattle.

Comparison of bones, especially of skulls, with those found in earlier excavations and ancient pictures of cattle from monuments, seals and vases in Egypt, the Near East, and Greece, have led Mr. Coolidge to the opinion that this newly discovered wild ox of tropical Asia may be close to the ancient ancestral line that has given the world its domestic cattle. This, however, remains an undecided point.

Mr. Coolidge has given the animal the new generic name of Novibos, making its full scientific name *Novibos sauveli*.

Science News Letter, November 9, 1940

Young *leaves* are often pink or lavender tinted, which protects the green chlorophyll from the sun's rays.

PHYSIOLOGY—AERONAUTICS

Bailing Out at High Altitudes Requires Immediate Oxygen

Pilot Making Test "Jump" from Low Pressure Chamber Loses Consciousness When He Delays for 30 Seconds

A PILOT forced to abandon ship and bail out at 30,000 feet altitude has no time to lose and must start his emergency oxygen supply immediately, Milo G. Burcham, well-known test pilot of the Lockheed Aircraft Corporation, discovered when he passed out from oxygen lack and was only rescued in the nick of time in a test conducted by Dr. Walter M. Boothby, Dr. W. Randolph Lovelace II and Dr. Howard Burchell, of the Mayo Clinic.

The results of the test for which Mr. Burcham volunteered were reported to the Aero Medical Association meeting at Memphis, Tenn.

Mr. Burcham was in excellent physical condition at the time of the test, and has proved that he is less susceptible to oxygen lack than the average normal person. But he was out for 15 seconds, had stopped breathing and turned blue, without knowing it until he was told afterwards what an exciting experience he gave his companion.

The test was not made in the air in an actual parachute jump. It was made in the low-pressure chamber at the Mayo Clinic. Mr. Burcham and his observer entered the chamber wearing regular oxygen masks and ascended, by atmospheric pressure change in the chamber, to 35,000 feet in just over six minutes.

He then proceeded to "bail out," using the wrong method, as the test dramatically showed. Instead of adjusting his emergency oxygen mouthpiece immediately after removing the regular oxygen mask, he first went through the motions of trying to open a jammed cockpit cover, releasing the safety belt, and standing up as though to jump out. When at this point, only 30 seconds after removing the regular oxygen mask, he started to adjust the emergency oxygen mouthpiece, he was already "fast losing consciousness."

The emergency mouthpiece fell out of his mouth, he became completely unconscious, and fell over on his side. Prompt action by the observer in supplying him with 100% oxygen rescued him. But in actual flight conditions, there would be no such chance for rescue and the pilot would probably not live to pull the cord on his parachute, if he remained conscious long enough to start the jump.

"All other procedures for bailing out must be deferred until after oxygen is started," the Mayo Clinic physicians conclude, in which Mr. Burcham undoubtedly joins after his experience.

"The emergency parachute oxygen apparatus," pilots are warned, "must therefore be in place for instant use whenever a high altitude flight is undertaken."

Science News Letter, November 9, 1940

PHYSIOLOGY—AERONAUTICS

Brain Suffers from Repeated Oxygen Starvation

REPEATED periods of oxygen starvation of the brain will sooner or later damage that vital organ if no symptoms or brain damage appear after the first time or two, warned Captain Melvin W. Thorner, reserve medical officer, U. S. Army, and Dr. F. H. Lewy, of the University of Pennsylvania.

The absence of symptoms "should not delude one into failing to assure an adequate oxygen supply in aviation or in other situations in which anoxia (oxygen lack) may be present," they declared.

A reserve of nerve cells in the brain may prevent the appearance of symptoms of brain damage after the first time or two when a pilot flying at high altitudes without oxygen, or a patient under anesthetic for a surgical operation, temporarily is deprived of a full supply of oxygen to his brain. Destruction of the reserve nerve cells in the brain probably occurs, animal studies showed. Because these are reserve cells, however, the brain goes on functioning without apparent damage.

"However," the doctors stated, "a time must inevitably come when the cerebral reserve can no longer compensate for the damage done."

Science News Letter, November 9, 1940

Euclid's geometry, 2,200 years old, is the oldest school book in use.

NEW OXYGEN MASK

Oxygen, on which the high altitude flier's life depends, can be supplied by this mask which Dr. Alvan L. Barach and Dr. Morris Eckman, of Columbia University College of Physicians and Surgeons, devised for airplane pilots and for heart disease or pneumonia patients. Advantages of the mask reported by Dr. Barach to the Aero Medical Association are: 1. Easier breathing because the carbon dioxide content is one-tenth that in masks with rebreathing bags; 2. Provision of constant oxygen percentage in the inspired air.

PHYSIOLOGY—AERONAUTICS

Signs of Heart Damage From Oxygen Lack at 5,000 Feet

Significant Changes in Electrocardiograms Noted at 5,000 Feet Becoming Greater at Higher Altitudes

HEART tests on officers and men of the U. S. Army Air Corps show that signs of heart damage due to oxygen lack may appear at altitudes as low as 5,000 feet, Captain M. S. White, U. S. A., assistant director of the School of Aviation Medicine at Randolph Field, Texas, revealed at the meeting of the Aero Medical Association in Memphis.

The tests were made by taking electrocardiograms of the men at ground level and in actual flight at succeeding levels of altitude. They were made on 45 healthy volunteers from officers and enlisted men of the U. S. Army Air and Medical Corps who flew without oxygen in routine flights of U. S. Air Corps bombers and transport planes. The flights were to 20,000 feet with various rates of ascent and to an altitude of, and remaining at, 15,000 feet for two hours.

"Significant changes were noted in the electrocardiograms" of the kind sometimes seen in certain forms of heart disease, Captain White reported. These changes were first noted at 5,000 feet and became progressively greater with increasing altitudes. Slower ascents gave slightly lessened changes than more rapid ones.

In continued flight at 15,000 feet for two hours, signs of compensating mechanisms in the heart appeared.

Giving oxygen reversed all the changes back to normal.

Oxygen should be used in flights as low as 5,000 feet, rather than at 10,000 feet and above as is now done, Captain White advised. He said that the changes revealed by the electrocardiograms suggest that lessened supply of oxygen to the heart through the blood is the cause of the heart damage.

"At the present time, until further investigation and engineering skill could overcome the technical difficulties for proper oxygen administration (pressure cabins)," he said, "use of oxygen at a minimum level of 7,500 feet would be a more practical measure."

Science News Letter, November 9, 1940

MEDICINE

Diet Experiments May Add To Knowledge of Cancer

A NEW clue from diet experiments to help solve the problem of cancer of the liver was presented by Dr. Julius White, National Cancer Institute chemist, to the American Chemical Society meeting in Detroit.

Cystine, an essential sulfur-containing diet ingredient, played an important role in the experiments Dr. White reported. This chemical which is a constituent of protein is a diet requirement of both normal and cancer tissues, Dr. White discovered.

In the experiments reported, the liver cancers were caused by a dye commonly known as butter yellow because of its appearance, though it has nothing to do with butter. With a diet lacking cystine, cancer failed to develop in rats getting butter yellow, although liver damage resulted from the effect of the dye. With an adequate diet containing plenty of cystine plus butter yellow, enormous liver cancers developed.

The explanation, Dr. White believes, is that the butter yellow acts as a poison, destroying the liver cells. The cystine in the diet, however, neutralizes this toxic effect of the dye and helps the damaged liver to regenerate by growing new cells. But this new growth, called regeneration, is a wild, uncontrolled growth that becomes cancer. Experiments are now under way to determine whether by adjusting the amounts of butter yellow and cystine the latter can prevent cancer from developing.

Butter yellow is not present in any foodstuff, Dr. White explained. The object of his research is to learn more about the behavior of cancer and its diet requirements, in the hope of finding better ways of fighting cancer.

Science News Letter, November 9, 1940

Severe cold last winter killed about half of *Finland's* fruit trees.

PHYSICS

Strange Light of Service In Work of Peace and War

Polarized Light Leaves Laboratory To Work for Man; Has Many New Uses as Result of Scientist's Ingenuity

By WATSON DAVIS

A STRANGE sort of light, a scientific curiosity for 250 years, is being put to work in peace and war. It is a kind of light that to the ordinary eye seems no different from any other, yet it dances in a very restricted and circumspect way to make possible a hundred personal, industrial and military applications.

This light is called "polarized." Scientists will tell you it vibrates in one plane only. Famous Christian Huygens, in 1690, first recognized and began the explanation of this phenomenon. Professors have demonstrated it to their classes.

For years rare natural crystals like Iceland spar and tourmaline have been used as polarizing agents, in testing and in research. The basic test for ordinary sugar depends upon polarized light. But only very small areas of polarizing materials were available.

In 1852 a British scientist, Dr. William Bird Herapath, discovered, with the aid of his microscope, that tiny crystals formed by combining iodine with quinine salt had remarkable polarizing ability. But neither he nor anyone else was able to make sizable and practically useful areas of the synthetic crystals, called Herapathite. No one, that is, until the young American physicist, Edwin H. Land, tackled the task and solved it. He made a polarizing sheeting composed of the tiny quinine-iodine crystals, millions upon millions of them, suspended in a synthetic resin and all lined up the same way. This synthetic light-control material, trade named "Polaroid," produces or screens polarized light as desired, making possible extensive applications for the first time.

Will Aid Search for Planes

As America rushes its defenses, the old phenomenon of light polarization will find many more new applications, many of them kept secret for the sake of national security. When the eyes of soldiers attempt to penetrate the glare of the sky in search of enemy dive bombers, when the sea is scanned for submarines, the sheeting that screens polarized light will prove useful. In gun sights, periscopes, rangefinders, telescopes and in dozens of other ways, polarized light will be made to serve the military machine we are building.

In industry and in our everyday living, polarized light makes for lower costs, safety and comfort in scores of applications, ranging from fish inspection to motion pictures.

Consider the benefits conferred on the fish inspector, or fish candler as he is known. Polarized filters have banished for him the eye strain and fatigue that arise from looking at fresh fish silhouetted in ordinary bright light. The inspector of fish views fish after fish, just as an egg candler holds up eggs to a bright light for inspection. By use of polarizing screens, he sees only light that comes through the fish. The result is that fish-packing organizations have increased efficiency of inspections and have fewer rejections by Government inspectors who protect the public from inferior fish.

Inspects Bottles and Soap

Bottles by the thousands undergo a polarized light inspection to pick up defects in annealing. Cakes of soap, too, have their surface imperfections revealed when illuminated with polarized light—an inspection technique used by soap manufacturers.

To prove that beauty is only skin deep, polarized light is used in inspecting the skin of beautiful women. Bathed by polarized light and viewed through a polarizing filter surface highlights and reflections on the feminine skin are wiped out and sub-surface imperfections stand out in sharp detail.

The eye specialist can look his patient in the eye without fear of glare—the kind that is reflected from the eye of the patient without any emotional connection. The polarizing ophthalmoscope plays polarized light into the eye; the ophthalmologist views the eye through an analyzer which screens the reflection from the outside surface of the eye, and allows him to look deep inside without hindrance.

Trapped False Claimant

Polarized light, applied to eye examinations, has trapped persons who falsely claimed damaged eye sight in order to collect insurance. One young woman claimed that one of her eyes was damaged in an accident. The examiner gave her a pair of polarizing glasses with the planes of polarization of the two lenses at right angles to each other. She was asked to read from one of those scrambled alphabetical charts that eye doctors use. The trick in the examination was to first project the charts on a screen with vertically polarized light and then quickly switch from vertically to horizontally polarized. This means that the image can be seen by only one eye at a time. When the woman kept reciting as the illumination changed from vertically to horizontally polarized light, it proved conclusively that she was seeing equally well through both lenses and, therefore, with both eyes. Her $50,000 claim for damages was thrown out of court.

Crack railroad trains speeding over western plains are light-conditioned as well as air-conditioned. Light conditioning is made possible by windows of two polarizing discs with flat surfaces against each other. They are mounted in such a way that the outer disc is set stationary to block all reflected glare while the inner disc can be moved by turning a knob, whenever the passenger wants to reduce or increase the amount of light that enters the car. Exactly the same principle is used in new variable sun glasses which enable the wearer to reduce the brilliance of a scene simply by touching a button on the glasses.

Three-Dimensional Movies

Three-dimensional pictures, either still or in motion, black and white, or in color, are made possible and practical by using polarized light. The trick is similar in principle to that of the old stereoscope that was a familiar entertainment in the parlors of our grandfathers. The new three-dimensional photographs allow one eye to look at a picture that the other eye can't see because it is wearing a polarizing screen opaque to that kind of polarized light. The same thing applies to the other eye. Thus, the two eyes see slightly different pictures just as they do in real life scenes. This gives the illusion of depth.

The new vectograph process, as it is called, produces three-dimensional prints without distortion and the same process

makes possible the projection of three-dimensional pictures in natural color, either motion or still, with the use of standard motion picture projectors. Thousands of amateur photographers will soon be producing snapshots with real depth, and millions of moviegoers in the future will have the screen of their theaters disappear and become a stage before their eyes.

Solves Engineering Problems

To the engineer, polarized light brings the possibility of solving difficult engineering problems. Little models of bridges, buildings, airplanes, gears and other mechanical structures are built, and the stress within them can be determined by still another application of polarized light.

Solving the problem of glaring automobile headlights seemed imminent when the invention of Polaroid light-controls was first announced about four years ago. This invention which might very well save thousands of lives a year is not yet ready for application to America's millions of automobiles. There are a good many problems involved, not the least of which is the fact that every windshield and every headlight on all cars must be equipped with polarizing screens if all motorists are to receive protection all the time. Polaroid is finding other uses, meanwhile.

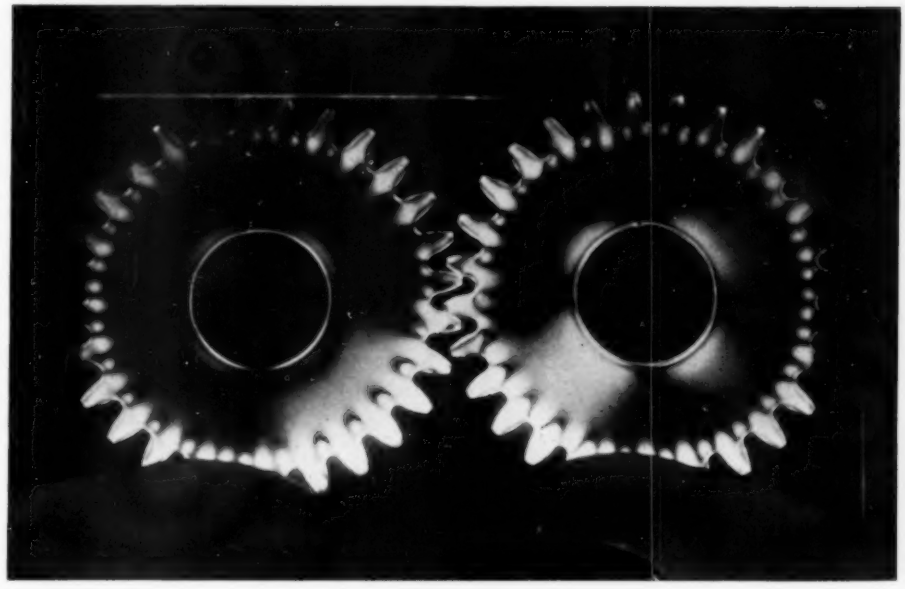
Colorful for Advertising

It does a colorful advertising job—literally. By placing colorless sheeting, like cellophane, between two polarizing screens colors are produced like those of the wings of a butterfly, or oil slicks on water. This phenomenon is being used practically in advertising displays, murals and stage sets.

Polarizing filters do for the camera what polarizing glasses do for vision. They reduce unwanted surface reflections and eliminate the "hot" spots of reflected light. Scattering of molecules in the atmosphere produces at least partial polarization of blue skylight. Since this is the case, polarizing filters can be made to darken a blue sky in a snapshot when attached to a camera, and photographing in a direction at right angles to the sun.

The scattering of particles under water produces partial polarization of the subsurface light. Hence, under-water photographers are able to create a dark background against which foreground objects stand out in sharp clarity and contrast.

Polaroid light-control material has an ever growing list of practical applications.



PRACTICAL APPLICATION

Models of gears are made with transparent bakelite and examined between polaroid screens. Dark lines indicate areas of strain in the model gears which would also occur in actual steel gears. Strain points are observed where the gears mesh.

Marksmen use it in gun sights to ease the eyestrain of target shooting. Amateur motion picture cameramen use it to get smooth professional "fades." Draftsmen use it to take the glare from drafting boards. Engineers use it to build giant telescopes. Textile experts to foretell the wearability of cotton fibers. It is used to study the corona of the sun. Sound engineers use it to determine the grain of crystals in phonograph pickups. In thin film research it is used to determine the presence of layers only one molecule thick.

It is used as an aid in research for the cure of cancer. It makes three-dimensional X-ray pictures which can be viewed simultaneously by many doctors.

These and many other applications are made possible by Edwin H. Land's invention of the first polarizing screen made synthetically in almost limitless areas. With polarized light as a raw material, the scientist fashions new tools and the manufacturer makes new machines and products.

Science News Letter, November 9, 1940

ASTRONOMY

Theories of Spiral Galaxies Questioned by Astronomer

CURRENT theories of the evolution of the huge spiral galaxies, star systems that look like pinwheels and are really similar to our own Milky Way but outside its limit, are questioned by Dr. Gunnar Randers. He is a Norwegian astronomer now at the Yerkes Observatory of the University of Chicago.

In a paper in the *Astrophysical Journal* (October), he says that there is no observational evidence for the idea now held that the "old" spirals are formed from "young" elliptical nebulae.

"Many spirals," he says, "suggest that the greater part of their material may be in the arms. If the arms were ejected from a system originally densely packed, the almost complete dissolution of that system would have been accomplished against the pull of the system's gravitational force."

He suggests that "the nebular patterns are formed by the redistribution of the matter inside the originally 'smooth' nebula. This redistribution would take place early in the evolution of the nebula while it is still young and stars have not yet been formed from the gas of which it is composed."

Science News Letter, November 9, 1940

RESOURCES

Shortage of German Glass Overcome by Americans

AMERICAN chemists and glass makers have overcome the threatened war shortage of an important German-made medical glass by learning how to make this rare glass, W. L. Munro, president of the American Window Glass Company, announced.

The particular glass in question is the very thin and clear glass used as cover slips. Like the cloth slip covers used by careful housewives to protect furniture, these glass cover slips are used to protect blood or other material being examined under a microscope.

Medical examinations of the men drafted for Army training will increase the need for this glass more than 33%, it is stated. During the World War, medical scientists were hampered in some of their work because this type of glass could not be made anywhere but in Germany and of course that supply was cut off.

The glass, to be known commercially as Lustra Cover Glass, is extremely thin and practically colorless. Its thickness varies from 5/1000 of an inch to 10/1000 of an inch as compared with the normal home window glass that is 91/1000 of an inch in thickness.

A total of 36,000 separate ¾-inch square cover slips will only equal the amount of glass in a glass block 12 inches long by 12 inches wide by 1 inch thick.

Science News Letter, November 9, 1940

RADIO

Football Televised and Broadcast In Spanish

FIRST major football games to be televised and the first to be broadcast by short wave in Spanish for the benefit of South and Central American listeners—these are two of the records being set this fall by games of the University of Pennsylvania at Franklin Field.

The television broadcasts are through station W3XE of the Philco Corporation. From the cameras on special scaffolds, the signals are transmitted over co-axial cables to nearby Convention Hall, on the roof of which is a special relay transmitter W3XP, used several months ago in televising the Republican Convention in the same building. This sends the signals to the W3XE transmitter in North Philadelphia.

The Spanish short wave broadcasts are through the Columbia short wave station WCAB. These are given by Adrian Rubio and Alfonso Luis, Spanish sports commentators. The broadcasts start at 1:30 p.m., half an hour before the game, the preliminary time being devoted to an explanation of football fundamentals. In addition, two 15-minute talks on Tuesdays and Thursdays are to be devoted to descriptions of football, its rules and technique.

The Saturday broadcasts are on 15,270 kilocycles and the mid-weekly ones on 9,590 kilocycles.

Future games are with Harvard, Nov. 9; Army, Nov. 16, and Cornell, Nov. 23.

Science News Letter, November 9, 1940

WILDLIFE

Lack of Mineral Salts May Cause Dying Off of Game

LACK of certain minerals in the soil, especially common salt and its close chemical relative, potassium chloride, may be an indirect cause of the periodic, wholesale waves of death among game animals and birds, suggests Dr. F. W. Braestrup of the Zoological Museum, Copenhagen, Denmark. (*Science*, Oct. 18).

Once in ten years, the wild rabbit population builds itself up to maximum numbers. Then the animals die off very rapidly, of what wildlife managers have come to call "shock disease"—a malady marked by degeneration of the liver, but with no germ cause that has ever been detected. Similar outbreaks of "shock disease" sweep away other species, from mice to grouse, in cycles of varying length.

Dr. Braestrup has noticed similar, though milder, symptoms in an ailment of cattle known as "licking disease," which seems to be due to acute lack of certain necessary mineral elements.

At times of maximum rabbit population, just before the outbreaks of the devastating "shock disease," signs of salt starvation in the animals have been noticed by various observers. So acute is their hunger for anything salty that they lick or gnaw at any object that has been touched by sweaty human hands, and will chew up discarded boots.

In the parallel "licking disease" among domestic livestock, the same licking behavior has been observed. In this case, the salt-hunger has been traced to the need for mineral elements to balance acids formed during the digestion of grass. So Dr. Braestrup suggests the possibility of a like cause in the epidemics of "shock disease" among game species.

Science News Letter, November 2, 1940

IN SCIEN

PHYSIOLOGY

Anti-Baldness Vitamin A Sugar-Like Substance

A NEW vitamin that prevents baldness in mice turns out to be a sugar-like compound known to chemists as inositol, Dr. D. W. Woolley of the Rockefeller Institute for Medical Research reports. (*Science*, Oct. 25.) Discovery of the vitamin was reported recently, but its chemical structure had not been determined at the time.

Inositol is a compound containing carbon, hydrogen and oxygen in the same proportions in which they exist in glucose and other simple sugars, but with the atoms differently arranged in the molecule. It occurs naturally in liver and other animal tissues, as well as in plants.

Science News Letter, November 9, 1940

ARCHAEOLOGY

Bronze Age War Relics Found by Archaeologists

RARE relics of war in the Bronze Age, two molds for casting bronze arrowheads have been unearthed at an old unfortified settlement explored by Soviet archaeologists in the Ural Mountains.

Schoolboy discoveries consisting of bronze spearheads and other relics attracted archaeologists to the site, which lies not far from the city of Sverdlovsk on the eastern side of the mountains, says a report from the Soviet news agency, Tass.

The village now brought to light was inhabited in the Ananino period of civilization, which flourished from the eighth to the third centuries B. C. Soviet archaeologists pronounced the bronze arrowhead molds so rare that only four others are known throughout the world. Other objects showing technique of ancient metal workers, recovered from the village ruins, are clay mold cores used to form the sockets in spearheads and adzes, a clay nozzle for bellows, drops of copper and copper slag, and numerous defective bronze articles which apparently resulted from faulty production.

The discoveries have been brought to the Historical Museum in Moscow.

Science News Letter, November 9, 1940

NE FIELDS

BACTERIOLOGY

Wisconsin Bacterium Aids Industry in Puerto Rico

A SPECIES of soil bacteria discovered on the campus of the University of Wisconsin is proving useful in the development of industry in Puerto Rico. It is a germ that has high capacity to convert molasses into butyl alcohol, much in demand as a commercial solvent, especially in the paint industry.

The organism was discovered by Prof. Elizabeth McCoy, University of Wisconsin bacteriologist, and named *Clostridium Madisonii* for the place of its discovery.

One of the severe problems of butyl alcohol production in Puerto Rico has been a germ-killing virus or bacteriophage that seriously reduced production. The difficulty was solved by developing a strain of the new bacterium that is resistant to the virus.

Science News Letter, November 9, 1940

PHYSIOLOGY

"Doping" Of Athletes Is Advised Against

"DOPING" of football players and other athletes, to enable them to put forth strenuous efforts even when they are tired, is editorially disapproved by the *Journal of the American Medical Association*. (Oct. 12) Some of the substances used for this purpose are known to be ineffective, some are of doubtful value, and a number are definitely injurious.

Apparently few, if any, of the "dopes" favored by athletes and their coaches really add anything to the immediate strength of the users. As a rule, they operate by temporarily deadening the sense of fatigue, as in the case of phosphate salts and caffeine. Cocaine was once considerably used as a "dope" by athletes; however, the editorial states, the extent to which it is used at present is unknown.

"The group of drugs including valerian, bromides and barbituric acid derivatives can be included," the *Journal* continues, "but there seems to be no danger of abuse among athletes since every one of these substances has powerful fatigue-producing properties. Digitalis and glyceryl trinitrate likewise can be readily eliminated both because of insufficient evidence of their 'doping' properties and because of their toxic effects."

One honorable exception is made, in the case of sugar. Many coaches give their teams candy, which is made of either dextrose or cane sugar. This is simply a "quick food," and may actually do the straining muscles some immediate good.

In conclusion, the editorial states: "Medical advisers must naturally strictly forbid the use of any agent suspected in any manner of being deleterious or any substance which may cause the least direct danger of whipping up the organism to extreme exertion. Although there can be little objection to the use of nutrient agents, of vitamins and of oxygen, the medical adviser should also do everything he can to discourage the use of costly and ineffectual substances."

Science News Letter, November 9, 1940

PUBLIC HEALTH

U. S. Has 56,000 New Cases Of Alcoholism Annually

AN ESTIMATE of 56,000 new cases of chronic alcoholism in the United States each year, with the total number of chronic alcoholics perhaps running near 900,000, was given by Dr. Norman Jolliffe, of Bellevue Hospital and New York University, in a report to the Research Council on Problems of Alcohol.

An actual survey of chronic alcoholics in the United States has not been made, Dr. Jolliffe pointed out. His estimate of new cases was based on first admissions to mental hospitals of patients with alcoholic mental disease for the year 1937. The 5,639 such first admissions are estimated to be 10% of the total new cases of alcoholism each year.

The figure for total number of chronic alcoholics was reached by applying figures from Yugoslavia and Germany in which actual surveys showed 1.5% of the population between 20 and 70 years of age suffered from some form of chronic alcoholism. The figure of 900,000 for the United States would have to be adjusted, Dr. Jolliffe said, for many factors in this country are different from those obtained in most European countries.

"We know," he explained, "that the incidence of alcoholism varies greatly with the distribution of urban and rural population, with the sex ratio, with the age composition and with many other factors."

Science News Letter, November 9, 1940

PSYCHIATRY

May Prevent Shell Shock By Psychological Studies

PREVENTION of shell shock, which afflicted large numbers of men in the World War, can be accomplished by psychological studies on potential soldiers to weed out susceptible ones, Dr. Crawford N. Boganz and Lieut. Col. Charles M. Strotz, U. S. Army, declare.

The year of military service of the new conscripts will be valuable for observing these men who may some day have to defend our country, to determine which ones are likely to break down in times of stress and emergency and who should therefore be assigned to less demanding situations where they can be military assets rather than liabilities.

Shell shock is a popular word which actually does not accurately label any single mental disease. Many people use the word for any mental disorder affecting anyone who has seen military service.

The current report of the Administrator of Veterans' Affairs, however, indicates that there is no more shell shock or mental disease among veterans than among the rest of the population. The 55% of the hospital beds of the veterans' administration filled with patients suffering from nervous and mental sickness is identical with the 55% occupancy of all hospital beds in the country by patients with similar disorders.

Science News Letter, November 9, 1940

GEOLOGY

Oil Strike in Manchoukuo Spurs Japan in Oil Hunt

THE first oil well in Manchoukuo, which spouted in Jehol province last April to the delight and excitement of Japan's war lords, is reported yielding enough oil per day to spur Japanese to start digging another well.

Test borings for oil by Japanese in northwest Manchoukuo are also in progress, says a report to the American Council of the Institute of Pacific Relations. In Inner Mongolia, Japanese engineers are reported at work on large-scale drilling at Dalai Nor, where they think more oil treasure may be hidden.

Whether the continental oil hunt will yield sizable quantities needed by Japan for war planes, ships, and industry remains to be seen. Japan, dependent on outside sources for about 90% of the oil she uses, requires something like 42,000,000 barrels a year.

Science News Letter, November 9, 1940

CHEMISTRY

Oil for Defense

"Liquid Gold" May Play Role Coal Had in World War; Products Include Explosives, Dyes and Drugs

By JAMES STOKLEY

See Front Cover

IN THE first World War, it was coal that was the great mother raw material, making possible explosives, dyes, drugs and a whole spectrum of chemical products.

In the present emergency, America is turning more and more to "liquid gold," oil or petroleum, and the gases, natural or those produced from oil, that go with it. From petroleum, chemical research has shown the way to make a large variety of essential war materials: toluene to make TNT for the dive bombers; synthetic rubber to counter the threat of Japanese aggression in the East Indies, synthetic glycerine, and a host of other substances.

In addition, of course, there still remains the use of oil and oil products for their own sake; gasoline for airplanes, for the tanks and the tractors to pull the big guns, oil for the Diesel locomotives and engines of ships that carry supplies and men.

Coal tar, source of so many useful chemicals, was at one time a waste product in gas manufacture. In like manner, at the time of the last war, gases given off in connection with the refining of gasoline were wasted. Either they were discharged into the air, or were burned in a flaming torch to eliminate any hazard from them.

Dr. Robert E. Wilson, group executive of the Petroleum Section of the National Defense Advisory Commission, who has been responsible for much of the research which has brought out the uses of these gases, explains their two principal sources as follows:

"First, what is essentially natural gas dissolved in the crude which comes off in the process of distillation and, second, the larger quantity of 'cracked' gases which are produced as a by-product of cracking. This process of breaking up large molecules into smaller ones suitable for gasoline, like most crushing operations, results in the production of a certain amount of 'fines,' or molecules too small to go into gasoline. These boil below ordinary temperatures and hence come off as gas. For many years, practically the only use for such gases was to burn them as refinery fuel. Indeed, they attracted so little attention that no accurate analyses of their constituents were available until recent years."

Propane, a gas that boils at 42 degrees below zero Fahrenheit, was one of the first of these gases to find an application. This can be liquefied, even at a temperature of 100 degrees, if subjected to a pressure of about 200 pounds per square inch. Liquid propane has helped to carry city comfort into the country, for it is the "bottled gas" that enables farmers' wives to use gas ranges and ovens, even though far away from metropolitan gas mains.

In a paper in the technical journal, *Chemical Industries,* Henry N. Wade, president of Parkhill-Wade, gives some of the latest information about this liquefied petroleum gas, or "L. P. G.," as he designates it for convenience.

"During the first years of the L. P. G. business, from 1922 to 1928," he states, "practically all sales were of the 'bottle gas' type. In this period the total sales grew from about 200,000 gallons per year to about 2,600,000. In 1928 appear the first substantial sales for 'industrial' use, amounting to 400,000 gallons for the year. This type of application was simply a logical expansion of the bottle gas idea, extending the use of the fuel to all sorts of firing which require absolute cleanliness or exceptionally sensitive control, or both. . . . Since 1928 the industrial use has grown from 400,000 gallons annually to 128,000,000 in 1939, while in the same period the bottle gas business has increased from 2,600,000 to 84,600,000 gallons."

In general, Mr. Wade points out, these are situations where natural gas would be used if it were available. They include the firing of ovens in bakeries, baking drying enamel on sheet metal parts, burning vitreous enamel on stoves, plumbing fixtures, etc., melting glass and blowing glassware, firing high grade pottery, heat treating and annealing tool steels, and dehydrating fruit and vegetables. It is also used in place of more expensive acetylene to mix with oxygen for welding.

Perhaps, one of these days, you will have L. P. G. in your automobile, for it is already being widely used, in California especially, as a motor fuel for trucks and buses. Although the mechanism of the car must be changed to take such fuel, there seem to be certain advantages.

In addition to propane, there is also butane, which becomes a vapor just above the freezing point of water. Of course, engine temperatures are far above this, so no liquid is sent over from the carburetor into the cylinder to dilute the oil. It burns more cleanly and thus eliminates disagreeable odors in exhaust gases.

Mr. Wade tells of a passenger bus, belonging to a large fleet, which was converted for some of the first experiments. "After a few weeks," he says, "the operator noticed that this particular bus, which was on short interurban service, turned in more fares than any of the other outwardly identical buses on the same run. The operating company received several letters from habitual riders on the line, asking what had been done to that bus to eliminate fumes, and why the rest of the buses could not be fixed up the same way."

Even more romantic, perhaps, is the way in which these gases serve as the bricks from which the chemist can build a multitude of other useful substances. The ethylene glycol that you use in your auto radiator in winter as an anti-freeze was one of the first compounds to be made from them on a large scale.

Alcohol, one of the most important of all industrial chemicals, comes from the gases. Dr. Wilson says that now about half of our requirements of industrial alcohol can be supplied from two large plants operating on cracked gas. This

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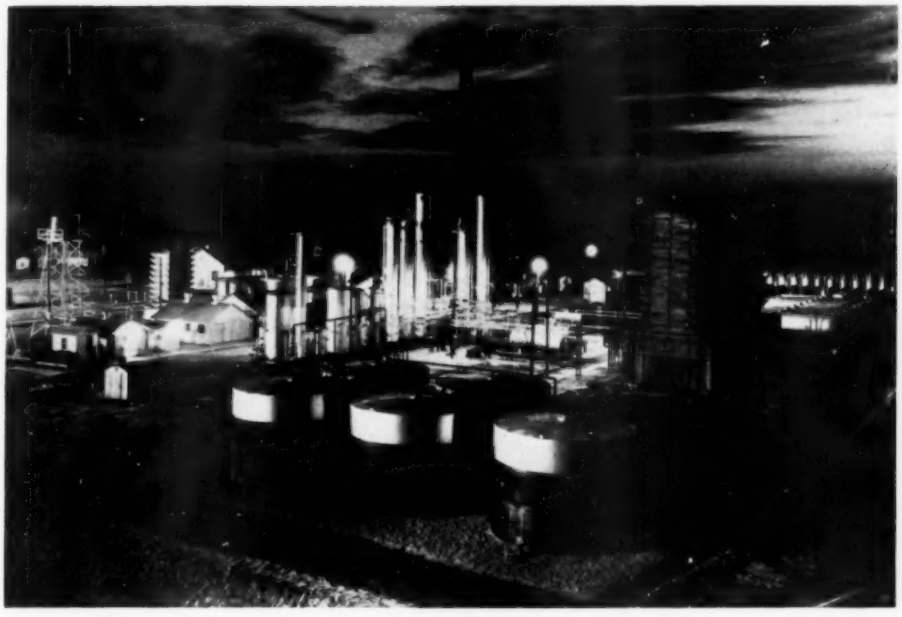

LATE ACTIVITY

Modern refineries work at night to take care of America's modern needs.

is more than a hundred ordinary breweries or distilleries could produce. Further, it is purer than alcohol produced by fermentation, which means that, though the immediate effects of internal use are the same, the morning after is not so bad with the synthetic product.

Two important kinds of synthetic rubber, including one that is now actually on the market in the form of tires, start with petroleum gases, while a third could be made from this source if necessary. They are the origin of an important new plastic, vinylite. Theoretically, soaps and fats could be made from them, but such a process is not as yet commercially practicable. Propane, combined chemically with chlorine, is used to make a new anesthetic, cyclopropane.

From propylene, another chemical relative of propane, it has been found possible to make glycerine, important in many chemical industries, particularly for explosives. Though this has not yet been put on a commercial basis, it might well be done if defense needs require greatly increased amounts of glycerine.

It is not from the gases but from the parts of petroleum that go into gasoline itself, that toluene is made. This is the basis of TNT, most important of the high explosives used in shells and bombs. Up to now it has been chiefly obtained from coal tar, but at least two large plants are to be built shortly to provide it from petroleum. These will be important links in the defense chain that is being forged for our protection.

Most dramatic has been the way that these researches have improved gasoline itself. With only an increase of about five times in the amount of crude oil going into the refineries since 1916, the production of gasoline in the United States, says Dr. Wilson, has increased about twelve-fold. This has been made possible by great increase in efficiency. Formerly, refiners merely extracted the 19% of gasoline already present in the crude. Now, thanks to cracking methods which convert the heavier portions of the crude oil into gasoline, producers secure a 44% yield. It would, indeed, be possible to secure more than 90%, but there is still a demand for other petroleum products which prevents this.

From the petroleum gases comes an increase of the gasoline yield. A process called polymerization, the opposite of cracking, recombines the small gas molecules into the medium-sized ones suitable for gasoline. More than 600,000 gallons of such polymerized gasoline are now being made daily.

By a related process compounds are made which, though expensive, are proving of immense value to the aviation industry, for with them super-aviation fuels can be made with octane numbers as high as 100. With high degree of freedom from knock, much higher compression ratios can be used in the engines, resulting in greater efficiency, with smaller fuel loads and lower engine weight per horsepower. These factors are equally welcome in a commercial plane, where they allow higher pay loads, and in military aircraft, permitting more

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bombs to be carried, or a longer cruising radius.

With petroleum assuming such an increasingly important place, one naturally wonders about the potential supply. This seems ample, for the present at least, but such research methods as these must go on to assure their most efficient use. Figures on the world's petroleum are given in a recent paper by John W. Frey of the petroleum conservation division of the Department of the Interior in the *Geographical Review*, published by the American Geographical Society of New York.

"In 1939," he says, "the world production of crude oil was about 2,100,000,000 barrels, of which more than three-fourths was produced in the western hemisphere, a little more than one-eighth in Europe, and about one-tenth in Asia." Of course, in some parts of the world there is a great potential supply that may be realized in the future, but now, he states, "the United States and Russia are the only great world powers that have self-sufficient production."

He concludes with a warning:

"The United States produces about 60 per cent of the world's oil and consumes about 55 per cent. The economic and social structure built on oil during the past 30 years differentiates this country from all others. It is almost impossible to find a shred of American life that is not affected by oil. No other industry has a more highly developed technology or a more efficient personnel. Violent economic consequences have been generated by the uncontrolled development in most states and production in excess of demand has on several occasions in the past decade placed the industry in a perilous condition. The present known reserves are satisfactory for the immediate future, but the magnitude of the base of demand, now a billion and a third barrels a year, has such far-reaching effects that a continuous supply at low cost is of national interest.

"The prevention of avoidable waste has been in the hands of the states for a number of years, and there are states in which the objectives of the laws and the administration leave little to be desired; but this cannot be said of all the states. The lack of coordination in the matter of waste is a national problem—one that we cannot afford to meet with careless indifference. Only through the wise use of this vital and irreplaceable fluid energy can this country avoid many of the extremely serious difficulties that confront other nations."

Science News Letter, November 9, 1940

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PHYSICS

Electron Microscope May Be Combined With Television

THE electron microscope, now being made commercially in this country as well as in Europe, can be advantageously combined with television, according to U. S. Patent 2,219,113, just granted Martin Ploke, Dresden, Germany. He has assigned his rights to the Zeiss-Ikon Aktiengesellschaft, also of Dresden.

The size of the light waves themselves sets a lower limit to the dimensions of objects visible through an ordinary microscope. Electrons, behaving like waves of much smaller size, are used in the electron microscope to form the image, and they reveal smaller details. Though the electrons cannot be focussed with lenses, this is accomplished with coils of wire, setting up electrical and magnetic fields to bend the electron beams.

In his patent specifications, Mr. Ploke says that when the object to be examined is bombarded with electrons heat is produced, and that his invention avoids this.

In one arrangement, he uses a beam of X-rays to throw a shadow of the object being examined on a thin metal foil closing one end of a vacuum tube. Where the X-rays fall, electrons are given off; these are focussed, by electrical and magnetic means, on a sensitive television transmitting surface. The currents can be amplified many times, and the picture viewed on a television receiver.

Though the patent does not mention it, another advantage seems to be that the object under examination is in the open air, while in one form of electron microscope, now on the American market, the object must be in an evacuated chamber. Also, if desired, the television receiver could be some distance away, with a wire, or even a radio connection, to the microscope proper.

X-rays, being of much shorter wave length than light rays, reveal details as well as the electrons. For use where such extreme magnifications, of 20,000 diameters or more, are not desired, Mr. Ploke also describes a device using ultraviolet waves, shorter than visible light, though not as short as X-rays. These form an image of the object on a window at one end of the tube, electrons are given off where the rays fall, these are focussed on a fluorescent screen at the other end, where they are changed to light, and the magnified image is clearly seen.

Science News Letter, November 9, 1940

Bread sold in England is now standardized to four loaf sizes.

Serbia's *gypsies* are vanishing, says an anthropologist, who reports that they are settling in gentile villages, adopting village trades and manners, forgetting Romani speech, and marrying gentiles.

● RADIO

Frederick Osborn, official of the American Eugenics Society will discuss "Mothers and Fathers of Tomorrow" as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service. Eugenics Society will discuss "Mothers and Fathers the Columbia Broadcasting System, Thursday, Nov. 14, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST.

Listen in on your local station. Listen in each Thursday.

BACTERIOLOGY

Electron Microscope Shows "Strep" Has Outer Membrane

Observation Accounting for Grouping of These Germs One of First Bacteriological Results with Instrument

THE streptococcus germ, one of the commonest of disease microorganisms, has a rigid outer membrane that accounts for the grouping of these germs in chains.

This is one of the first bacteriological results of research with the electron microscope conducted by Dr. Stuart Mudd of the University of Pennsylvania School of Medicine's department of bacteriology with the collaboration of Dr. L. Marton of the RCA Manufacturing Company who took the electron micrographs. Dr. Mudd reported his findings to the National Academy of Sciences meeting at the University of Pennsylvania. (See *SNL*, Oct. 12.)

These rigid outer membranes that surround the streptococci are different in composition from the inner protoplasm. With the usual crude straining methods and use of ordinary optical microscope, the streptococcal cell appears to be a tiny lemon-shaped mass of undifferentiated protoplasm. Pictures made with the electron microscope enlarge the germs some 12,000 or more times and reveal the outer cell membrane.

The variety of germ studied by Dr. Mudd was the beta hemolytic streptococcus of Lancefield's Group A in the mucoid, smooth and rough phases. In one case a few of the germs were subjected to a short period of sonic vibration to disintegrate them, producing "ghost" cells. These mixed-up cells do not differ significantly in outline from the intact cells, but do differ in opacity to the electron beam, due to the escape of protoplasm from the interior of the cell.

Dr. Mudd will give details of his discovery in a joint paper with Dr. David B. Lackman in the *Journal of Bacteriology*.

Insight into the nature and meaning of fine structure will not necessarily increase in proportion to the increase in resolving power, in Dr. Mudd's opinion.

"To publish very much on biological aspects of research with the electron microscope at this stage," Dr. Mudd said, "would be almost as rash as for Alice to report on the flora and fauna of Wonderland after one or two trips down the rabbit hole."

Within the minute confines of the streptococcus germ, a mere micron in diameter, there are produced such a large variety of products that, as Dr. Mudd puts it, a large factory would be necessary to manufacture them outside the living cell. Dr. Mudd and his colleagues have discovered that these germs have amazing metabolic potentialities, producing among other things a substance that kills rabbits and mice. He concludes that the internal material of the cells must be very complex rather than simple and uniform as hitherto believed.

The streptococci have been raised by Dr. A. M. Pappenheimer and George Hottle of the University of Pennsylvania upon a synthetic medium that gives double the growth upon ordinary germ food. This new medium includes six B vitamins, essential amino acids, carbon and minerals.

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Army aviators are conducting a series of test *parachute jumps* from high altitudes, to learn, for instance, how far a flier must fall in an emergency jump before pulling the rip cord of a parachute, to avoid asphyxiation in the rare and cold atmosphere.

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PHYSICS

"Dry Water" Shown Before Academy of Sciences

WATER made "dry" by a single layer of molecules was shown to members of the National Academy of Sciences, meeting at the University of Pennsylvania. Dr. Irving Langmuir, Nobel prize laureate and physicist of the General Electric Company's Research Laboratory, showed it in illustration of a lecture on the peculiar properties of such layers on a water surface.

A thin film of formvar, plastic used for electrical insulation, was held about a sixteenth of an inch above the liquid. The water vapor immediately caused it to go limp. But when a drop of tricosanic acid was spread on the surface, and made to cover the water, the film became rigid, showing that the invisible acid film prevented the escape of water vapor, thus effectually making the liquid "dry."

In another demonstration, he set fire to a mixture of ether and water, and extinguished it with a layer of oleic acid molecules. This does not smother the flame by cutting off the oxygen from the air, it was explained, but rather the layer stops movement in the solution. Without the top layer, the solution is in rapid motion, bringing more ether to the top to burn.

A possible means of measuring the amount of oxidation of automobile oil was illustrated in another experiment.

First, a little used oil was dropped on the surface of water in a tray, so it spread, forming a colored film. By moving barriers along the surface towards each other, he could compress the film, changing its thickness, and the colors. Then he added about a 30-millionth of an ounce of olive oil in the center of the lubricating oil film, which produced a well-defined "invisible film" within the first. It spread out as a black film, revealed only by the way it was outlined by the oil.

With new lubricating oil, no film could be formed, but merely a lens on the water surface. With oil that was very old, and greatly oxidized, it made a film too thin to show any colors. He suggested that this could be used to measure the oxidation; by measuring the amount of new oil that must be added to produce the color films.

Science News Letter, November 9, 1940

MEDICINE

Vein Grafts Used to Bridge Gaps in Wound-Torn Arteries

PIECES of veins can be successfully grafted to bridge gaps in wound-torn arteries with aid of the anti-blood-clotting substance, heparin, Dr. Gordon Murray, of the Toronto General Hospital and University, announced at the meeting of the American College of Surgeons in Chicago.

Heparin was discovered many years ago but has been available in a purified form suitable for use on patients only since 1934. It has now been given safely to about 700 patients, except for a few months when about half the patients receiving it had reactions, Dr. Murray reported.

Only four of these patients got it in connection with the vein grafting operations. In three of these, the operations were successful and Dr. Murray credits heparin with the success. Reason for giving heparin in such cases is to prevent formation of dangerous clots while the vein graft on the artery is healing. These operations have been tried before when a piece of an important artery, such as the carotid in the neck which supplies the head with blood, or the big arteries supplying blood to the legs, is destroyed by injury or disease. The attempts to graft a piece of vein to bridge the gap have heretofore, however, not been satisfactory because of blood clot which stopped up the artery.

Heparin is available to any hospital from the Connaught Laboratories in Toronto at a cost of $3.40 per vial, Dr. Gordon stated. It must be given continuously, because its effect does not last more than one hour. For the average patient, about two vials per day are required, making the total cost between $6 and $7 per day. As many of the indications for the use of this substance occur in diseases which require treatment for only three or four days, usually 10 days at the outside, the total cost of treatment is not a very large item and "does not run to the figures involved in funeral expenses," Dr. Gordon states.

Science News Letter, November 9, 1940

NUTRITION

Cockroaches Get Along Without Any Vitamin A

SUPPOSEDLY necessary for all forms of animal life, vitamin A has been found entirely superfluous in at least one species—the common cockroach. Experiments demonstrating this have been reported by Dr. C. M. McCay of Cornell University.

A colony of cockroaches was kept on a diet known to contain no vitamin A. They should have sickened and died. Instead, they throve and multiplied in swarms. To make certain that they were not manufacturing the vitamin in their own bodies, Dr. McCay made an extract from five pounds of the insects and fed it to rats kept on a vitamin-A-free diet. The rats developed all the symptoms of vitamin A deficiency.

Plainly, somehow cockroaches are able to get along without vitamin A.

Science News Letter, November 9, 1940

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CONSERVATION

NATURE RAMBLINGS
by Frank Thone

War and Whaling

WHALING in the Antarctic has been completely disorganized by the war. Even information about it has suffered an almost total blackout, partly because whaleoil products can be used in munitions, partly because the firms that normally produce harpoon guns and the explosive-headed missiles that they fire have apparently been drafted into war service.

Only a few facts have leaked through the wall of censorship and the fog of ignorance caused by disrupted communications. Some of these facts, however, are causing grave concern among scientists here who are interested in the conservation of the world's largest mammals, the whales.

Most serious element in the entire situation is the fact that the Japanese, notorious as the worst game-hogs among whale-killers, have the whole Antarctic whaling ground to themselves this season. The biggest European whaling fleet, the Norwegian, had not got home last spring when Norway was overrun by the Nazis; their ships are scattered and tied up in neutral ports. The German whalers, of course, are still in Hamburg harbor—if British bombs have not ruined them.

British whalers have not gone south this year. There was a two-year reserve supply of whaleoil in Britain when the war broke out, and there are large quantities of oil in the United States at present for which there is no immediate market. It is waiting, in bonded storage. Whale ships of other nations are negligible in number, and their present whereabouts is unknown.

All this sums up to one probability: That the Japanese whaling fleet, consisting of six factory ships and 48 attendant killer boats, will simply run amuck in Antarctic waters, recklessly killing every whale they can catch, in complete disregard of international conservation rules—to which the Japanese government has consistently refused to adhere, anyway. The larger part of their catch will go to Germany, via the Trans-Siberian Railway, unless Balkan events cool off Soviet willingness to help Hitler.

Of course, if the Japanese choose to build up the reopening of the Burma road into a *casus belli*, their whaling fleet will be a fat prize (in the most literal sense of the term) for the small but efficient Australian navy. It is the regular custom of the Japanese whalers to put into the West Australian port of Freemantle on their way to the Antarctic, for fuel oil and provisions, so that their movements must be fairly well known to Australian authorities.

Science News Letter, November 9, 1940

MEDICINE

Too Much Vitamin D, Calcium Hinders Healing of Bones

A NEW method of treating patients with broken bones which upsets present widely-held opinions was announced by Dr. Edward L. Compere, of Chicago, to the American College of Surgeons meeting in Chicago.

Patients with broken bones, he warned, should not be given extra doses of vitamin D or of calcium salts. Current practise is to prescribe large amounts of one or both of these substances because both are known to be essential for bone formation. Instead of helping broken bones to knit faster, this practise may actually retard or prevent healing, Dr. Compere declared. So much has been published about the importance of vitamin D and calcium or lime for healthy bones, Dr. Compere said, that if the surgeon does not prescribe these in cases of broken bones, the patients ask for them.

Experience with patients and experiments on rats convinced Dr. Compere that it is a mistake to give calcium and vitamin D beyond what is in the diet of patients with broken bones.

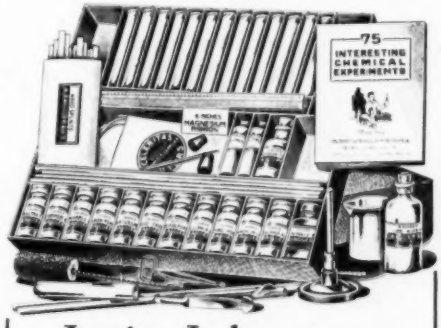
Broken legs knit fastest in rats that were on a good diet with very small amounts of extra vitamin D, he discovered. Rats with broken legs that got relatively large amounts of the vitamin or of calcium or both did not do so well. In this latter group the broken bones healed more slowly. In some the center of the callus forming at the ends of the broken bones began to die off, showing that something added to the diet had a poisonous effect on new-forming bone.

A patient who had been given enormous doses of vitamin D in an effort to speed union of a broken bone had, when Dr. Compere saw her, the serious bone disease, osteomalacia, instead of a healed bone.

Surprisingly, Dr. Compere discovered that when rats were on a diet with too little calcium, although their bones were thinner than normal, the broken legs healed almost as rapidly as in rats on an adequate diet, and more rapidly than in rats on adequate diets supplemented with vitamin D and calcium.

Only exception to Dr. Compere's rule of not giving extra vitamin D and calcium in cases of broken bones is in infants. Babies, whether they have broken bones or not, need vitamin D to protect them against rickets. Older children and adults, Dr. Compere explained, can get all the calcium and vitamin D they need from their diet, and in the case of the calcium, or lime, cannot absorb any extra amounts even if they take it.

Science News Letter, November 9, 1940



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First Glances at New Books

PSYCHIATRY

PSYCHIATRY FOR THE CURIOUS—George H. Preston—*Farrar & Rinehart,* 148 p., illus., $1.50. Information about mental ills written in pleasant style for the layman and illustrated with amusing sketches by the author, commissioner of mental hygiene for the state of Maryland.

Science News Letter, November 9, 1940

ECONOMICS

A SEARCH FOR A HAPPY COUNTRY—Marion Foster Washburne—*Nat'l Home Library Foundation,* 269 p., 50c. In this informally written book, you can see Europe from a fresh viewpoint. The author feels that she did find a happy country—in Estonia. In a postscript written after the red flag was flying there, she clings to this impression for, she says, they still have there six essentials to happiness—food, home, work, education, health and love. And she regards it as unlikely that any censorship can restrict the freedom of expression of these people who have a secret language no one else can understand.

Science News Letter, November 9, 1940

PSYCHOLOGY

CHILD PSYCHOLOGY (Rev. and Enl.)—Arthur T. Jersild—*Prentice-Hall* 592 p., $3. Parents as well as teachers and students of psychology will find interest in this new edition. The new chapters include material on establishment in young children of good habits in the routines of daily life, on children's interests, their imaginative activities, and their moral and religious concepts. Other parts of the book have been brought up to date.

Science News Letter, November 9, 1940

ENGINEERING

THE STORY OF SUPERFINISH—Arthur M. Swigert, Jr.—*Lynn,* 672 p., $5. A rather detailed account of metal finishing processes, with special reference to the methods used by the Chrysler Corporation.

Science News Letter, November 9, 1940

LANGUAGE

SEMANTIC FREQUENCY LIST FOR ENGLISH, FRENCH, GERMAN, AND SPANISH—Helen S. Eaton, comp.—*Univ. of Chicago Press,* 440 p., $5. An excellent reference book for teachers and students of these foreign languages or of English. Words are listed with other language equivalents in parallel columns, according to the frequency with which they are used. In the first thousand are such familiar words such as can, little, great and war. In the seventh thousand are those that are seldom made use of—catholicism, vituperation, muleteer, epicure.

Science News Letter, November 9, 1940

GENERAL SCIENCE

WORKBOOK TO UNDERSTANDING SCIENCE, 106 p., tests, 68c.; WORKBOOK TO SCIENCE FOR DAILY USE, 116 p. tests, 72c.; WORKBOOK TO SCIENCE FOR HUMAN CONTROL, 122 p., tests, 76c.—Ralph K. Watkins and Winifred Perry—*Macmillan.* Price correction.

Science News Letter, November 9, 1940

ECONOMICS

TAX YIELDS: 1939—*Tax Policy League,* 126 p., $2.50. Statistics of federal, state and local taxes collected in recent years.

Science News Letter, November 9, 1940

ENTOMOLOGY

INTRODUCING INSECTS, A Book for Beginners—James G. Needham—*Jaques Cattell Press,* 129 p., illus., $1.50. One of the leading entomologists in America turns his hand to popularization of his science for young people making their first collections of insects, and succeeds most admirably. Text presentation is clear, concise, easy and chatty; line illustrations are neat and pertinent. A most excellent little book.

Science News Letter, November 9, 1940

ECONOMICS

THE CHORTI INDIANS OF GUATEMALA—Charles Wisdom — *Univ. of Chicago Press,* 490 p., illus., $4.50. A very complete study of an agricultural people of eastern central Guatemala, near the site of the Maya city of Copan (just over the line, in Honduras). They may well be direct descendants of the Copan people. In some ways they are more primitive than other Guatemalan Indians: they do not, for example, weave cloth. However, the differences as well as the similarity to other people in this area will interest anthropologists and those who have visited Guatemala.

Science News Letter, November 9, 1940

BACTERIOLOGY

ELEMENTARY BACTERIOLOGY (4th ed., rev.)—Joseph E. Greaves and Ethelyn O. Greaves — *Saunders,* 587 p., $3.50. Fourth edition of a well-planned and successful text.

Science News Letter, November 9, 1940

ASTRONOMY

LIFE ON OTHER WORLDS—H. Spencer Jones—*Macmillan,* 299 p., $3. Dr. Jones is England's astronomer royal, and, as such, the head of the Royal Observatory at Greenwich. Here he gives a carefully considered discussion of the possibility of life elsewhere than on the earth, and concludes that whenever conditions are right, as at rare intervals they probably would be, life will appear.

Science News Letter, November 9, 1940

ARCHAEOLOGY

THE OTHER SIDE OF THE JORDAN—Nelson Glueck—*American Schools of Oriental Research,* 208 p., 127 illus., $2.50. Far less well known than Palestine, Transjordania is yielding archaeological proof of its former importance. Dr. Glueck describes finds at King Solomon's seaport, Solomon's copper mines, and discoveries relating to Nabataeans, Edomites, and other groups who made history in this rugged country.

Science News Letter, November 9, 1940

AERONAUTICS

MODEL AIRPLANE CONTESTS — Published for Air Youth of America—*Appleton-Century,* 106 p., illus., $1.25. Complete details as to the planning and conducting of a model airplane contest, among the two million young people who now build and fly them.

Science News Letter, November 9, 1940

PHOTOGRAPHY

COPYING TECHNIQUE—Frank R. Fraprie and Robert H. Morris, comps.—*Amer. Photographic Pub.,* 128 p., illus., $1.50. Even photographers skilled in other branches of the craft often have trouble producing a copy that does not look like one. This very practical book should be a great help in avoiding that fault.

Science News Letter, November 9, 1940

HORTICULTURE

SHRUBS IN THE GARDEN AND THEIR LEGENDS — Vernon Quinn — *Stokes,* 308 p., illus., $2.50. Autumn is shrub-planting season in many parts of this country, so that this new book about shrubs makes a timely appearance. This is not, however, primarily a manual for gardeners, but a book of quaint and curious lore about shrubs, gathered from all lands and times. It should help to develop our appreciation of the personalities of the bushes we set out around our lawns and in our gardens.

Science News Letter, November 9, 1940